



Efficiency Standards Office

# Blueprint

Spring 1996 , No. 55

## California Energy Commission

### RESIDENTIAL STANDARDS

#### Questions and Answers

**Q** *If I build a steel framed wall with R-13 insulation between the framing, does this comply with mandatory wall insulation requirements?*

No. The wall must have the equivalent U-value of a wood framed wall with R-13 insulation, which is 0.088 U-value or better (lower) (*Energy Efficiency Standards*, Section 150(c)2). To determine if a steel frame assembly meets this U-value, you have several options:

- Use one of the pre-calculated assemblies found in Appendix I of the *Residential Manual*.
- Calculate the U-value using an ENV-3 for steel frame construction (from Appendix I or from the *Nonresidential Manual*).
- Calculate the U-value using EZFRAME or another method based on ASHRAE zone method.

You *cannot* use any of the following to document the U-value of a steel frame wall:

- Form 3R or any parallel path method
- Values from Table 4-4 in the *Residential Manual* which exceed 0.088 U-value
- Any U-value which is more than 10 percent different than values found in or calculated using one of the above referenced sources

**Q** *Would one fluorescent light in a kitchen installed over the sink or under one cabinet meet the "general lighting" requirements?*

No. Unless there is only light source in the kitchen, the general lighting must evenly light the entire kitchen. Two examples of acceptable lighting configurations are (1) fluorescent lighting (or other light source with at least 40-lumens/watt) around the perimeter of the kitchen (under or over cabinets), or (2) a fluorescent in the center of the kitchen [see the diagrams on page 2-18 of the *Residential Manual*]. The general light source must be activated by the first switch at all entrances to the kitchen.

**Q** *If a customer asks me not to install fluorescent lights in their home, are there any other light sources I can use to meet the bathroom and kitchen lighting requirements?*

Yes, although they may not be readily available, there are products other than fluorescent which meet the lighting requirements of the *Energy Efficiency Standards*, Section 150(k). The two criteria for the kitchen and bathroom general lighting are (1) a lamp with an efficacy of 40 lumens per watt or more, and (2) the fixtures cannot contain a medium base incandescent lamp socket. Table 2-5 on page 2-17 of the *Residential Manual* indicates the typical lumens per watt of several common products, some of which meet the required lumens/watt. Specifications from a product's manufacturer can also be used to verify that a product has at least 40 lumens per watt.

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## Questions and Answers (continued)

### **Q Does a site-built window need to meet air infiltration requirements?**

No. However, a manufactured product, which for compliance purposes is assumed to be site-built (no U-value label) must meet the air infiltration requirements. Therefore, even if no U-value label is attached, manufactured fenestration products must have a *temporary label* to show that the product complies with the *air infiltration* requirements of Section 116(a)1.

### **Q Is a custom window “site-built” for purposes of meeting air infiltration requirements?**

No. Most custom windows are manufactured and delivered to the site either completely assembled or knocked down, which means they are a manufactured product (see previous question for air infiltration labelling requirements). A window is considered site built when the windows are assembled at the building site from the various elements *which are not sold together as a fenestration product* (i.e., glazing, framing and weatherstripping).

### **Q As a general contractor, when I have finished building a residence, is there a list of materials I am supposed to give to the building owner?**

The “owner at occupancy” must receive a copy of the following completed forms for that dwelling unit:

- Certificate of Compliance (CF-1R)
- Mandatory Measures Checklist (MF-1R)
- Installation Certificate (CF-6R)
- Insulation Certificate (IC-1)

In addition, they must receive either:

- A manual which contains instructions for operating and maintaining the features of their building efficiently, or
- A *Home Energy Manual* (P400-92-031, \$3.00)

(Administrative Regulations, Section 10-103(b)(1)-(2)).

### **Q How can I obtain a large quantity of the Home Energy Manual?**

The manuals are available at a bulk rate of \$115 for a box of 100. Mail your check and request for P400-92-031 as instructed on the back page. *Home Energy Manuals* for distribution within the PG&E service area are free (individual copies or in bulk) as long as supplies last. Contact Elaine Hebert at (916) 653-7981.

If you would like to print your own copies of the Home Energy Manual, it is available on diskette in two formats:

(1) If you would like to modify the *cover only* to include your logo and/or company name and address, you may obtain a copy of the diskettes. Under this agreement, you may NOT edit the contents of the publication. [Order P400-92-031D1, \$20, available in Macintosh format only (address on back page)].

(2) If you intend to change the *contents* of the *Home Energy Manual*, you may obtain a copy of the “modified contents” diskette. It contains the text only in a generic draft word processing format and does not contain the cover or any of the graphics from the *Home Energy Manual*. With this version, the Commission does not retain editing rights and therefore cannot be referenced as supporting the edited subject matter. You must develop your own cover, title and graphics, and you *cannot* use the title *Home Energy Manual*. [Order P400-92-031D2, \$20, WP5.1 or 5.2, 3.5 inch floppy (address on back page).]

### **Q I build some multi-family buildings and have some questions about the information I must provide (as required by Administrative Regulations, Section 10-103). Specifically:**

**(1) If the building is a condominium, can I photocopy the same information for all units?**

Photocopied information is acceptable. It must be obvious that the documentation applies to that dwelling unit—that is, the features installed must match the features

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## Questions and Answers (continued)

shown on the Installation Certificate. If compliance documentation is for a “building,” a photocopy of the compliance forms for that building must be provided. If individual compliance is shown for each unique dwelling unit, a photocopy of the documentation which applies to that dwelling unit must be provided.

***(2) When the building is an apartment complex (not individually owned units), who gets the documentation?***

The documentation and operating information is provided to whomever is responsible for *operating* the feature, equipment or device (typically the occupant). Maintenance information is provided to whomever is responsible for *maintaining* the feature, equipment or device. This is either the owner or a building manager. (Section 10-103(b)(1)-(2).)

***(3) If an apartment is converted to condominiums, does each owner/occupant receive copies of the documentation?***

If, during construction, the building changes from an apartment to condominiums, each owner at occupancy would receive the documentation. If an existing apartment building changes to condominiums at a later date, the documentation requirements are triggered only by a building permit application requiring compliance with the *Energy Efficiency Standards*. (Changing occupancy does not trigger compliance with the standards.)

***Q What is my responsibility with respect to the CF-6R (Installation Certificate) (a) as an inspector? and (b) as a builder?***

The building inspector is responsible for checking the CF-6R at appropriate inspections to be sure it is filled out and signed for the completed work. Inspectors can verify that the installed features are “consistent with approved plans,” as indicated on the Certificate of Compliance (CF-1R) form. Since the CF-6R may be posted at the job site or kept with the building permit, the inspector

can request that this form be made available for each appropriate inspection. It is not advisable to wait until the final inspection to check the CF-6R. (Section 10-103(d)(2).)

The general contractor, or his/her agent (such as the installing contractor), takes responsibility for completing and signing the form for the work performed. (A homeowner acting as the general contractor for a project may sign the CF-6R.) The compliance statement for their signature indicates that the equipment or feature: is what was installed; is equivalent or more efficient than required by the approved plans (as indicated on the CF-1R); and meets any certification or performance requirements. (Section 10-103(a)(3)(A).)

***Q When plan checking a computer compliance submittal for a high rise residential building, I was surprised that it complied with electric resistance heating. Then I found the heating modeled as an appliance load. Is this the correct way to model space conditioning?***

No. Heating equipment cannot be modeled as an appliance load in the load calculations. If there is additional load caused solely by a process, it is modeled as a process load. For a residence, however, the heating load is for human comfort and is not a process load. It is rare that a building can comply with the energy budget with electric resistance heating as its sole space conditioning source.

## CLARIFICATION

Blueprint No. 54 contained compliance guidance for a new home which consisted of two separate buildings (one dwelling unit). The answer—that it be treated as one building—was based on the assumption that a single building permit was issued for the construction. If a building department issues separate building permits for each structure, each structure would need to show compliance independently.

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## NONRESIDENTIAL STANDARDS

### Questions and Answers

**Q** *After reading the information in Blueprint No. 53 about assumptions for a drop (T-bar) ceiling, I have additional questions:*

**(1) Can I get credit for fire-rated acoustic tiles?**

No. Although this type of construction helps to limit infiltration and exfiltration, the Standards do not have a provision to account for it.

**(2) How do I calculate the assembly R-value if the fixtures are IC-rated and covered by insulation?**

You have three options. First, you can use the insulation value alone to show that the R-value meets the requirement for the prescriptive approach. Second, you can follow the procedures described in *Blueprint No. 53* for non-IC-rated light fixtures and include the R-value of the insulation over the light fixture in assembly #2. For example, R-19 insulation becomes:

Assembly #1 (ceiling tile–90% of ceiling)  
 $R = 19 + [1.20/2] + 0.61 + 0.61 = R-20.82$

Assembly #2 (light fixtures–10% of ceiling)  
 $R = 19 + 0.61 + 0.61 = R-20.22$

U-overall =  
 $[(1/20.82) \times 0.9] + [(1/20.22) \times 0.1]$   
 $= U-0.048 \text{ (R-20.8)}$

Third, you can conservatively assume that the entire ceiling assembly is made up of light fixtures. In the above example the ceiling would be R-20.22/U-0.049 for a ceiling with IC-rated fixtures covered with insulation.

**(3) What if there is no lighting plan and therefore I don't know what percent of the ceiling is made up of light fixtures?**

In the absence of a lighting plan you may assume the following percentages:

Gen Commercial/Industrial	
Work Buildings	10%
Grocery	15%
Industrial/Commercial Storage	7%
Medical Buildings	12%
Office Building	12%
Religious Worship, Auditorium,	
and Convention Center	16%
Restaurants	12%
Retail and Wholesale	16%
Schools	15%
Theaters	12%
All Others	7%

**(4) How do I model the T-bar/light fixture assembly when using computer (prescriptive or performance) compliance?**

Either the framing function of the ENV-3 calculation is turned off, by selecting “none” for frame type or specify “no penetration” for entries. Follow the procedures outlined above for IC-rated fixtures covered with insulation or the procedures outlined below for non-IC-rated fixtures when modeling on a computer (excerpted from *Blueprint No. 53*).

The light fixtures, whether they are IC-rated or not, are modeled as two assemblies. The first consists of ceiling insulation, acoustic tiles and a T-bar grid. The second assembly consists of the luminaire and insulation, if any.

For example, the first assembly consists of the sum of the effective R-value of the T-bar/acoustic tile combined (50 percent of the tile's R-value to account for the effects of the metal grids), ceiling insulation and two inside air film resistances (0.61 R-value per air film).

Outside air film	0.17	} 0.61 total
air film (net 0.61-0.17)	0.44	
Insulation	19	
acoustic tile (1/2 R-value)	0.60	
inside air film	0.61	
R-value	20.82	

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## Questions and Answers (continued)

The second assembly which consists of non-IC-rated light fixtures is calculated as two inside air film resistances (0.61 R-value per air film). If the fixtures include plastic diffusers, the R-value of the light fixture should be calculated as two air film resistances and a 1.5 inch air space (0.77 R-value). Also, if the fixtures are IC-rated and covered by insulation, include the insulation R-value.

Outside air film	0.17	} 0.61 total
air film (net 0.61-0.17)	0.44	
Insulation	0	
inside air film	0.61	
R-value	1.22	

Rather than calculating an area weighted average R-value for the ceiling, the user can model the actual area of each of the assemblies.

## DID YOU KNOW . . . ?

### Association/Conference Information

. . . The California Association of Building Energy Consultants (CABEC) is holding its Annual Meeting July 26-27, 1996 at the Dunfey Hotel in San Mateo, California. Confirmed speakers include Jeff Johnson from Pacific Northwest Labs (Federal Standards) and Ross Deter, California Energy Commission (direction of energy standards programs for 1998 and beyond).

. . . CABEC, the California Association of Building Energy Consultants, is a nonprofit organization founded in 1986. Its purpose is to improve the practice of energy consulting through education, information, and the Certified Energy Analyst (CEA) program. At its 1995 Annual Meeting, this CEA program was officially recognized by the California Energy Commission for its "outstanding contribution toward raising the quality of energy standards compliance." As time permits, upcoming CABEC events and trainings will be noticed in the *Blueprint*.

To become a member, or for more information about the Certified Energy Analyst program, regional meetings or annual meeting, please call CABEC at (916) 974-1045.

### Publications

. . . National Fenestration Rating Council (NFRC) has released the fifth edition of the *NFRC Certified Products Directory*. This edition, invaluable when showing compliance with the *Energy Efficiency Standards*, includes U-value ratings for over 22,000 individual fenestration products. To order, send a letter requesting the *NFRC Certified Products Directory* along with a check for \$15 to NFRC, 1300 Spring Street, Suite 12, Silver Spring, MD 20910. NFRC can be reached at (301) 589-6372.

. . . Two new directories of certified products are available:

- Pool Heaters Certified to U.S. Department of Energy (P400-95-015, \$2.00).
- Refrigerators, Refrigerator-Freezers and Freezers (P400-95-018, \$8.70).

. . . You can purchase all 11 parts of the *California Building Code* from the International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, CA 90601 (310) 699-0541, or (800) 423-6587.

- Part 1, Administrative Code
- Part 2, Building Code
- Part 3, Electrical Code
- Part 4, Mechanical Code
- Part 5, Plumbing Code
- Part 6, Energy Code
- Part 7, Elevator Safety
- Part 8, Historical Building
- Part 9, Fire Code
- Part 10, Building Conservation
- Part 12, Referenced Standards Code

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## Did You Know...? (continued)

### Awards Program

. . . The first-ever Assuring Compliance with the Energy Standards (ACES) award ceremony was held at the California Building Officials Annual Business Meeting (March 1, 1996). The award program provides recognition to building departments for doing a superior job of enforcing the Standards through dedicated and innovative methods. Commissioner David Rohy presented certificates to the 20 winning building departments with subsequent awards to be given at local City Council or County Board of Supervisors meetings this spring.

The 20 ACES award winners are:

Building Divisions in the cities of:

- Benicia
- Indian Wells
- Lompoc
- Novato
- Redding
- Simi Valley

Building Departments in the cities of:

- Livermore
- Rocklin
- Visalia

Building and Safety Departments for:

- City of La Quinta
- City of Santa Paula
- County of Riverside

Building Inspection Divisions of:

- City of Milpitas
- County of Sacramento

Building and Safety Divisions of:

- Los Angeles County
- Santa Barbara County

Also selected were:

- Community Development Department of the City of Irvine
- City of Palm Springs Department of Planning and Building
- Planning Department of the City of Ukiah
- City of Chula Vista Department of Building and Housing

Commissioner Rohy stated that “innovative jurisdictions like these are helping to protect California’s energy future. By supporting energy efficiency in new residential and commercial construction, they have improved construction methods and encouraged the development of new products. As a result, today’s buildings are more energy efficient and more comfortable than older buildings.”

The ACES Award news release also noted that the Energy Commission estimates Californians have reduced their utility bills by an \$10.6 billion since 1978 (when the energy efficiency building regulations took effect), and predicts an additional \$11 billion in savings by the year 2000.

You can be a part of next year’s awards by nominating a deserving jurisdiction. Nominations packets will be mailed this summer.

### Changes to the Back Page

. . . The back page is changing to carry more of the often-needed information. This includes the Internet Web Site address, BBS phone number, FactsLine phone number, and how to change your Blueprint mailing address. This is in addition to the Energy Standards Hotline phone numbers and publications ordering information.

NOTE: The Internet Web Site and BBS were discussed in the last issue of Blueprint (Winter 1995/96, No. 54), with some additional information in this issue. Information about the new Hotline FactsLine is included in this issue.

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## Did You Know...? (continued)

### Automated Technical Assistance

. . . If you have a touch-tone phone and a FAX machine, you can access the Energy Standards Hotline FactsLine, a “fax-back” system which gives callers access to information via their FAX machine. Available information includes:

- A list of certified computer programs
- A list standards-related Commission publications

Coming soon:

- *Energy Efficiency Standards* by section number
- *Blueprint(s)* issues #41 through current
- *Energy Specs* (fact sheets)
- *Residential Manual* by page or chapter, and *Nonresidential Manual* by page or chapter.

You can reach the FactsLine at (916) 653-6830. You will then press 1, 2 or 3:

- 1 To receive a fax copy of instructions and a table of contents, which describes each document along with its assigned code number. This table of contents also lists the number of pages in each document, and approximately how long it will take to receive the document.
- 2 And the code number of the desired document(s) to receive a FAX
- 3 (Or waiting) to be transferred to the Energy Hotline (during Hotline hours)

. . . You now have another option for checking certification of appliances. You can use the Bulletin Board System (BBS) to check model numbers. If you have a modem, use it to call (916) 654-4069 and you will be guided through a menu. To access the BBS, prior

registration is no longer required (as previously indicated in *Blueprint* No. 54). After completing the on-line registration form, you can immediately access and use the BBS.

A number of other changes to the BBS are in place as a result of specific user suggestions:

- Simplified use
- The database is directly searchable by manufacturer name, brand name, model number and performance data while connected to the BBS.
- The files on the BBS are available through an anonymous FTP site on the Internet– <ftp://sna.com/pub/users/efftech/appliances>.

. . . Our Web Page now includes a listing of the most energy efficient refrigerators, refrigerator-freezers, freezers, and wine chillers. The listing is divided by style (e.g., side-by-side, top freezer, bottom freezer, etc.) and is updated every two weeks. The data in the listing contains the brand name, the volume, the model number, the amount the model exceeds the efficiency standard (at least 15 percent), the estimated annual kWh use, and the annual energy cost. The web site address is **<http://www.energy.ca.gov/energy/efficiency/appliances/refrig-freezers.html>**.

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## TRAINING

### Nonresidential Training Sessions

<u>Date</u>	<u>City</u>	<u>Sponsor</u>	<u>Topic</u>
May 21	Bakersfield	Eley	Building Envelope
May 22	Bakersfield	Eley	Lighting Systems
May 23	Bakersfield	Eley	Mechanical Systems
May 28	San Francisco	Eley	Building Envelope
May 29	San Francisco	Eley	Lighting Systems
May 30	San Francisco	Eley	Mechanical Systems
June 4	Sacramento	Eley	Building Envelope
June 5	Sacramento	Eley	Lighting Systems
June 6	Sacramento	Eley	Mechanical Systems
June 11	Downey	Eley	Building Envelope
June 12	Downey	Eley	Lighting Systems
June 13	Downey	Eley	Mechanical Systems
June 18	Fresno	Eley	Building Envelope
June 19	Fresno	Eley	Lighting Systems
June 20	Fresno	Eley	Mechanical Systems

**Eley** : Eley Associates, under contract to the Energy Commission, is providing training to assist design professionals in incorporating energy efficiency early in project design. For registration information, call (415) 957-1977 (FAX (415) 957-1381).

## PUBLICATION ORDERS

Include a self-addressed mailing label and a check or money order (prices include tax and postage) with your publication request addressed to:

California Energy Commission  
Attn: Publications MS-13  
P.O. Box 944295  
Sacramento, CA 94244-2950

## CHANGE OF ADDRESS

Send old and new addresses, with the five-digit ID number (appears above name on mailing label) to above address, Attn: MIS, MS 7.

## TECHNICAL SERVICES

Web Site  
<http://www.energy.ca.gov/energy/>

FactsLine (916) 653-6830

BBS (modem) (916) 654-4069

Hotline (800) 772-3300  
(916) 654-5106

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